Conditions for a Unique Triangle—Two Angles and a Given Side

1. has angles and and side cm. Draw triangle under the same condition. Under what condition is drawn? Use your construction to explain why is or is not identical to .

2. has angles and and side cm. Draw triangle under the same condition. Under what condition is drawn? Use your construction to explain why is or is not identical to .

1. In triangle , and . Side cm. Draw triangle under the same condition as . Leave all construction marks as evidence of your work, and label all side and angle measurements. What can be concluded about and ? Justify your response.

2. In triangle , and . Side cm. Draw triangle under the same condition as . Leave all construction marks as evidence of your work, and label all side and angle measurements. What can be concluded about and '? Justify your response.

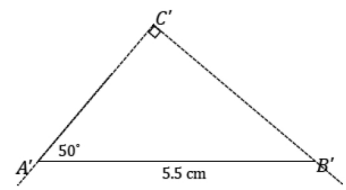
3. , , and are collinear, and . What can be concluded about and ? Justify your answer.

4. Draw so that has a measurement of , has a measurement of , and has a length of cm. What are the lengths of the other sides?

5. Draw so that has a measurement of , has a measurement of , and has a length of cm. What is the length of the longest side?

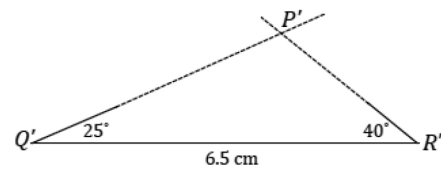
1. has angles and and side cm. Draw triangle under the same condition. Under what condition is drawn. Use your construction to explain why is or is not identical to .

The condition on is the two angles and the side opposite a given angle condition. Triangle is identical to . After drawing the given side length, I used the protractor to draw the angle adjacent to . I drew the angle opposite the given side, , on a slip of paper and lined up one ray of the angle on patty paper with one ray of the angle adjacent to the given side. I moved the angle on patty paper along the coinciding rays until the free ray just met the endpoint of . There is no other way to draw this triangle; therefore, must be identical to .



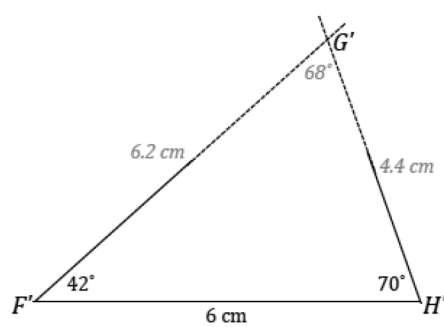
2. has angles and and side cm. Draw triangle under the same condition. Under what condition is drawn? Use your construction to explain why is or is not identical to .

The condition on is the two angles and included side condition. Triangle is identical to . After drawing the given side length, I used the protractor to draw the angle adjacent to . After drawing the included side length, I used the protractor to draw the provided angle measurements at either endpoint of the included side . Since these two angle measurements are fixed, the two remaining side lengths will intersect in one location, which is the third vertex of the triangle, . There is no other way to draw this triangle; therefore, must be identical to .



1. In triangle , and . Side cm. Draw triangle under the same condition as . Leave all construction marks as evidence of your work, and label all side and angle measurements.

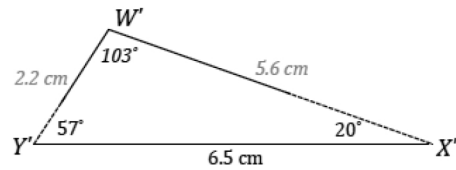
What can be concluded about and ? Justify your response.



and are identical triangles by the two angles and included side condition. Since both triangles are drawn under the same condition, and the two angles and included side condition determines a unique triangle, both triangles determine the same unique triangle. Therefore, they are identical.

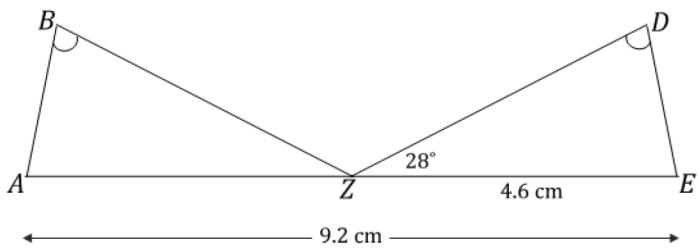
2. **In triangle , and . Side cm. Draw triangle under the same condition as . Leave all construction marks as evidence of your work, and label all side and angle measurements.**

What can be concluded about and ? Justify your response.



and are identical triangles by the two angles and the side opposite a given angle condition. Since both triangles are drawn under the same condition, and the two angles and the side opposite a given angle condition determines a unique triangle, both triangles determine the same unique triangle. Therefore, they are identical.

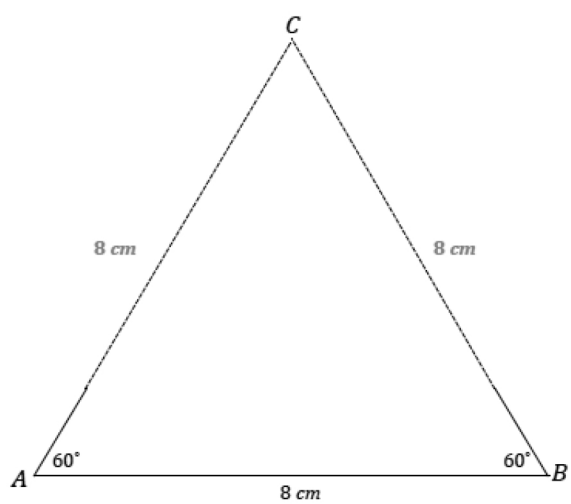
3. **, , and are collinear, and . What can be concluded about and ? Justify your answer.**



and are identical by the two angles and the side opposite a given angle condition. Since segments add, and is cm and is cm, must be cm. Since angles on a line sum to , , and , then . From the diagram, we can see that . The same measurements in both triangles satisfy the two angles and the side opposite a given angle condition, which means they both determine the same unique triangle; thus, they are identical.

4. **Draw so that has a measurement of , has a measurement of , and has a length of cm. What are the lengths of the other sides?**

Both of the other side lengths are cm.



5. Draw so that has a measurement of , has a measurement of , and has a length of cm. What is the length of the longest side?

The longest side has a length of cm.